Kilovoltmeter

Types 5621/5622



TETTEX AG INSTRUMENTS

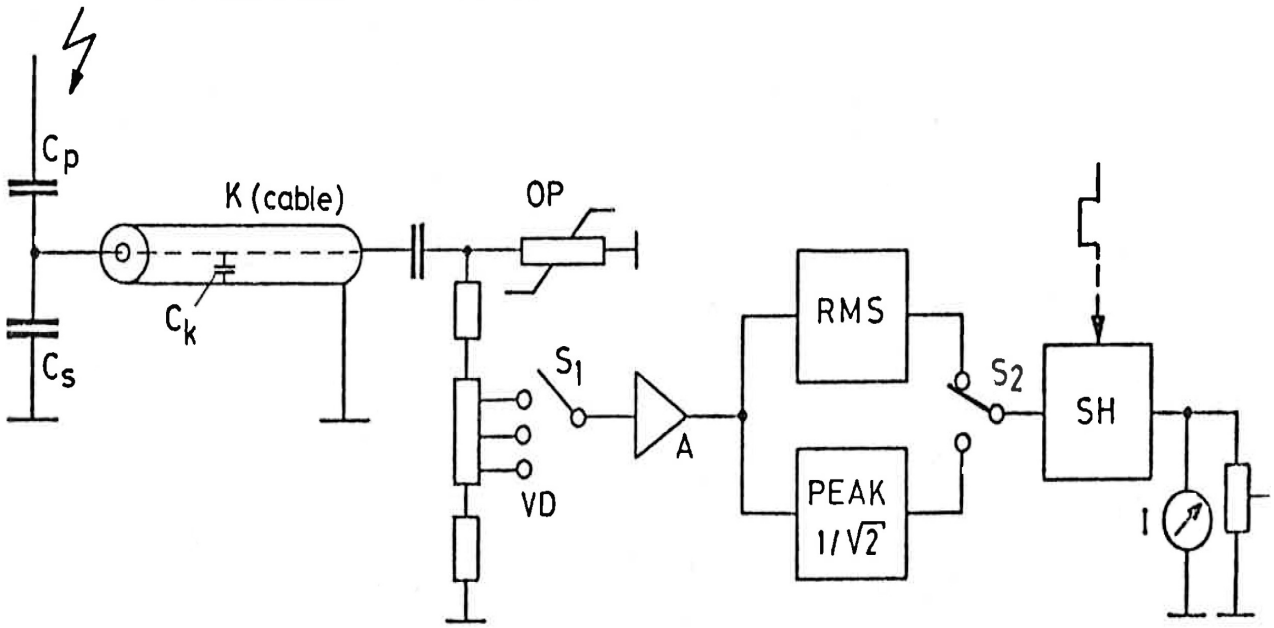
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1. General

This newly developed kilovoltmeter is designed for measuring high voltage. Via a capacitive high-voltage divider it measures voltage peak or r.m.s. values. These values are shown by analog display (Type 5621) or digital display (Type 5622). In position "PEAK" the display indicates peak value/$\sqrt{2}$; in position "RMS" it indicates r.m.s. value.

The obtained results can be stored and externally controlled via a recording system for which outputs exist already.



C_p	High-voltage capacitance
C_s	Low-voltage capacitance
C_k	Cable capacitance
K	Cable (RG 59, 67 pF/m, 75 Ω)
OP	Overvoltage protection
VD	Voltage divider
A	Amplifier
RMS	RMS converter
PEAK $1/\sqrt{2}$	PEAK $1/\sqrt{2}$ converter
SH	Sample and hold circuit
I	Indicator
S1	Range selector switch
S2	Mode selector switch

The KV meter is used with a capacitive voltage divider. The voltage divider consists of the primary capacitance C, the secondary capacitance C_s', and the capacitance of the cable (75 Ω). The ratio of this AC divider has to be 1 : 10'000.

Attention:
The length of the cable should not be changed !

2. Technical specifications

	Type 5621	Type 5622	
Display	analog	digital 3 1/2 digit	
Measuring ranges:		Nominal measuring range	Max. measuring range
(Other measuring ranges upon request)	50 kV	50.0 kV	70.0 kV
	100 kV	100.0 kV	140.0 kV
	200 kV	199.9 kV	199.9 kV
	500 kV	500 kV	700 kV
	1000 kV	1000 kV	1400 kV
Displayed values:	Position PEAK: peak value / $\sqrt{2}$ Position RMS : root mean square		
Accuracy:	1 %	0.5 % of measuring range ± 1 digit	
Input voltage	Position PEAK max. 100/$\sqrt{2}$ V Position RMS max. 100 $V_{eff.}$		
Input impedance	1 M Ω		
High-voltage divider ratio	$\frac{C_s + C_k}{C_p}$ = 10'000.		
Measuring frequency	15 ... 400 Hz		
Temperature range	+ 5 °C . . + 45 °C		
Output voltage for recorder or additional display	0.01 - 0.1 - 1 V (DC) fs		
Internal resistance	800 Ω		
Terminal for high-voltage divider	BNC socket		
Terminal for sample and hold cicuit	via external contact or electronic signal (TTL or CMOS level)		
Mains terminal	220/115 V, 50/60 Hz		
Power input	approx. 7 VA		
Fuses	125 mA F (220 V) / 315 mA F (115 V)		
Dimensions	482 x 88 x 320 mm (19" x 3.5" x 12.6")		
Weight	3.5 kg (7.7 lbs)		

3. Electronic part

The AC signal is amplified with factor 2 behind the input divider and converted into a DC signal either by a true RMS or a PEAK $1/\sqrt{2}$ converter. Switch S2 connects one of the converters with sample and hold circuit (transistors T_1, T_2, IC 5). Without any positive input at the sample and hold circuit (transistors T_3, T_4) the MOS FETs, T_1, T_2 are conductive and the signal is not stored. The output of IC 5 is converted into a current and indicated on the panel meter. The voltage divider parallel to the panel meter is used as recorder.

4. Maintenance

The KV meter is solid state and therefore doesn't need any maintenance.

Calibration:

4 1 Offset IC 1, IC 5:

With disconnected input and range selection switch S1 on position 1'000 kV adjust R 12 for a minimum DC output pin 6 IC 1 with a mV meter.
Ground the connection of the mode selection switch to R 27 (1 MΩ). Adjust R 27 for minimum DC output at pin 6 IC 5 with a mV meter.

4.2 RMS/PEAK calibration

Set mode selection switch on position RMS.
Set range selection switch on position 1'000 kV.
Feed input Pt. 1 with 100 V AC exactly and adjust R 13 for 1 V DC precisely at 1 V recorder output.
Adjust R 31 for full scale indication at panel meter.

Set mode selection switch on position PEAK.
Input and position of the range selection switch as described above. Adjust R 16 for full scale indication.

5. Order specification

Scope of supply

Kilovoltmeter

- Type 5621 with analog display
  or
  Type 5622 with digital display

- 1 cable*
  Standard lengths: 5, 10 or 20 m, 67 pF/m

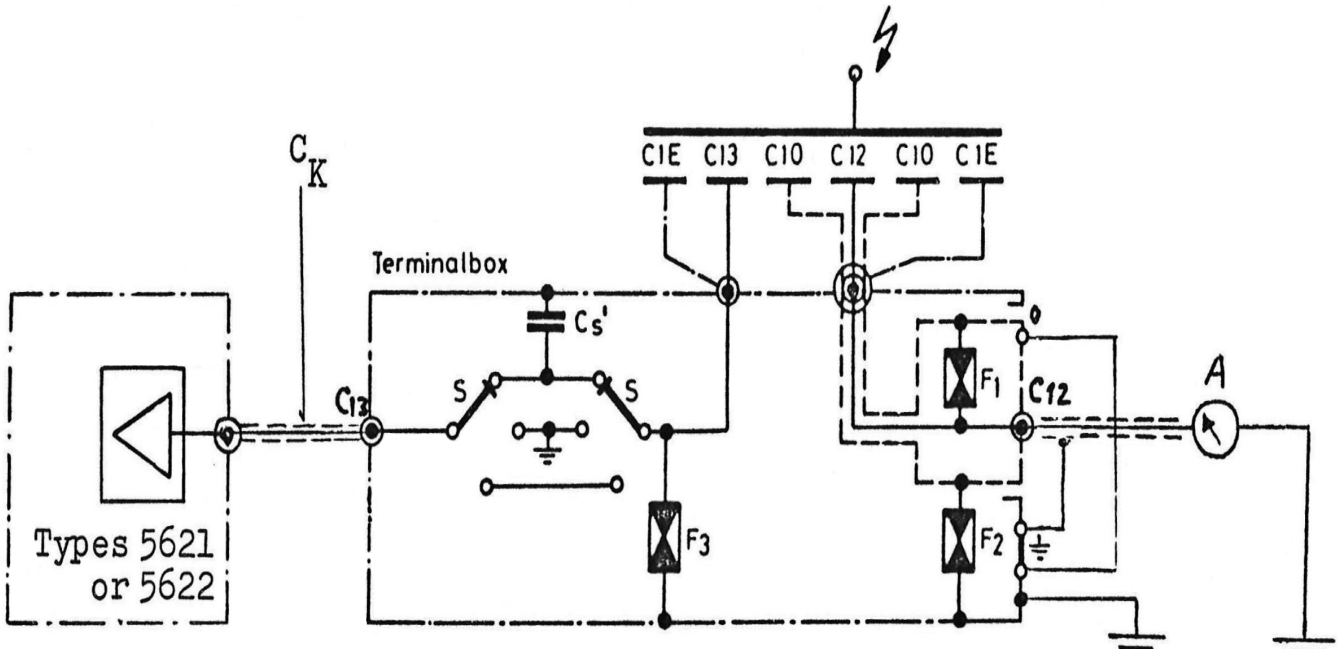
- 1 mains cable*
  Mains voltage 220 or 115 V

Important: If the kilovoltmeter is connected with a capacitive voltage divider, the ratio has to be $(C_s + C_k)/C_p = 10'000$ (see schematic diagram).

*Please specify order

Spannungsmessungen mit Pressgaskondensatoren Typ 3370

Voltage measurements with Pressed gas capacitors Type 3370



$$\frac{C_s' + C_K}{C_{13}} = \frac{10'000}{1}$$

C_s muss angepasst werden
(C_s must be adjusted)

Erdung der Schirmelektrode
Grounding of guard electrode

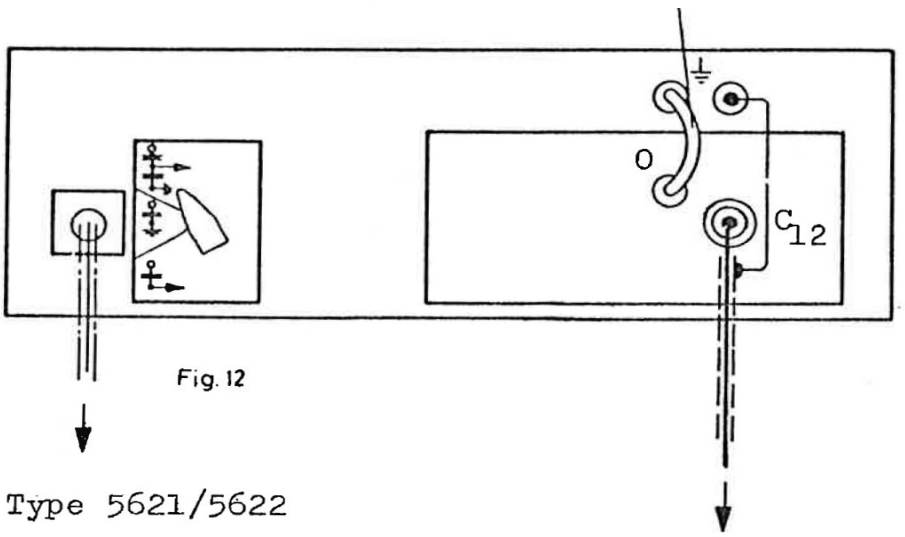
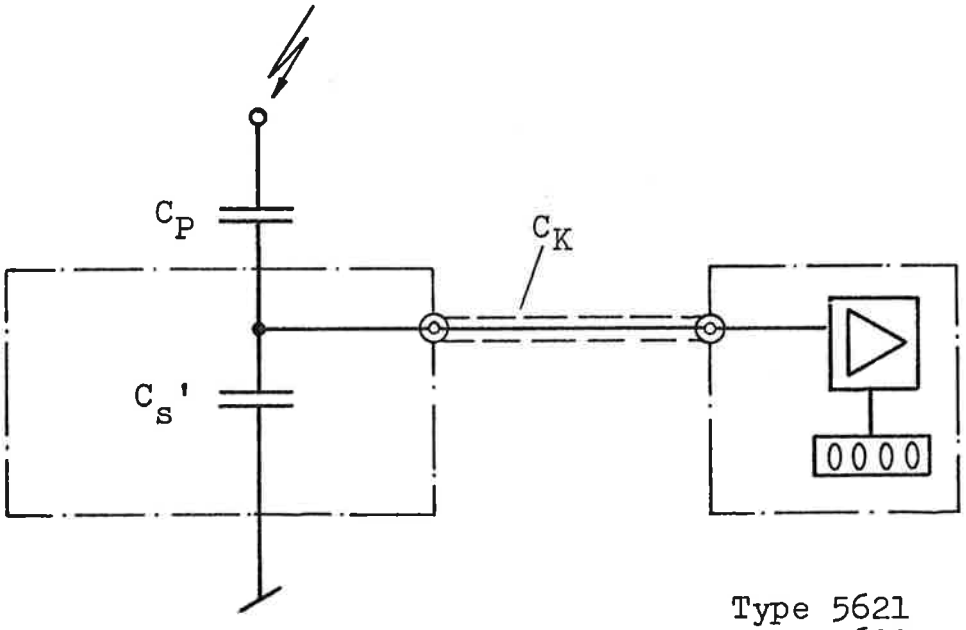


Fig. 12

Terminalbox of type 3370

Spannungsmessungen mit Kopplungskondensatoren Typen 9230

Voltage measurements with Coupling Capacitors Types 9230 for PD - measurements



Type 5621
or 5622

$$\frac{C_s' + C_K}{C_P} = \frac{10'000}{1}$$

C_s' muss angepasst werden

C_s' must be adjusted

La1
24V~
+15V
0
-15V
6,8µF 25V C28
6,8µF 25V C27
C22 0,1µF 100V
C21 0,1µF 100V
IC 7 MC 7815
MC 7915 IC 6
1µF 100V C24
1µF 100V C23
470µF 40V C26
470µF 40V C25
R50 100Ω
R51 100Ω
R53 1,5Ω
R52 1,5Ω
D8 B40 C 1500
TR 1
115V
115V
115V
115V
Drahtbrücken 115V / 50 Hz
Auf DPM 220V/115V
S3
Netzfilter
F1
F2
220/115V 50Hz
F 3 90V
Input
C1 1µF
K271/Z.0 Widerstand
R1
500k R2
Res.
500k R3
50kV
500k R4
100kV
250k R5
200kV
150k R6
500kV
50k R7
1000kV
50k R8
Gnd
S1
D1 1N914
D2 1N914
R9 15k
IC 1 CA 3140
R12 10k
R10 10k
R11 8,25k
R13 2k max. rms.
R14 8,25k
R18 4,99k
IC 2 AD 536 J
C2 1µF
C3 2,7µF
R43 23,7k
C4 2,2µF
R15 475Ω
R16 1k max. peak
R19 2,74k
R17 20k
IC 3 1/2 747
D3 1N914
D4 1N914
R20 20k
R21 10k
R22 20k
R23 20k
R61 2,74M
R62 50k
R24 4,99k
R27 1M
D6 rms
D7 peak
rms
C5 1µF
peak
S2
R60 10M
D5 1N914
R26 4,7k
R44 56Ω
IC 4 741
R25 4,7k
R46 1,5k
+15V
T3 2N4403
R38 4,7k
R36 15k
R39 15k
R40 4,7k
R41 6,8k
C7 47nF
T4 2N4401
R37 15k
R42 6,8k
Gnd
Hold circuit
T2 2N4352
C6 0,1µF
IC 5 CA 3140
R29 10k
T1 2N4352
R28 1M
R35 10Ω
R34 90,9Ω
R33 909Ω
R32 4,02k
Gnd
10mV
0,1V
1V
Output Recorder
S1
Res.
50kV
100kV
200kV
500kV
1000kV
C30 10µF
C31 10µF
C32 10µF
R59 20,5Ω
Zum Netztrafo 220V/115V
S 15 D 3 B 2 R 1
Von Trafo
Dez. Point
DPM
C20 0,1µF
R54 100k
R58 3,01k
R57 1k
R56 499Ω
R55 499Ω
1/4W 1%
1/4W 5%
1/2W 5%
1/4W 0,1%

Spannung	220	115	VAc
Frequenz	50/60		Hz
Strom	0.03	0.06	A
Sicherung	0.125	0.315	A

Stückliste : 5-14418-00
Verdrahtung-Zus.stell. : 1-14416-00

+15V
0
-15V
C8 C9 C11 C12 C13
C15 C16 C17 C18 C19 C14
alle Kondensatoren 6,8 µF 25V

Für 220V Anschluss DPM 7-14423-00-0
Für 110V Anschluss DPM 7-14471-00-0

A/7P 1424 → CA 3140 22.4.87 M.

Kilovoltmeter Typ 5622
Schema elektrisch Digital

Maßstab Echelle	Gezeichnet Dessiné	29.11.79	
	Geprüft Contrôlé	6.2.80	
	Gesehen Vu		

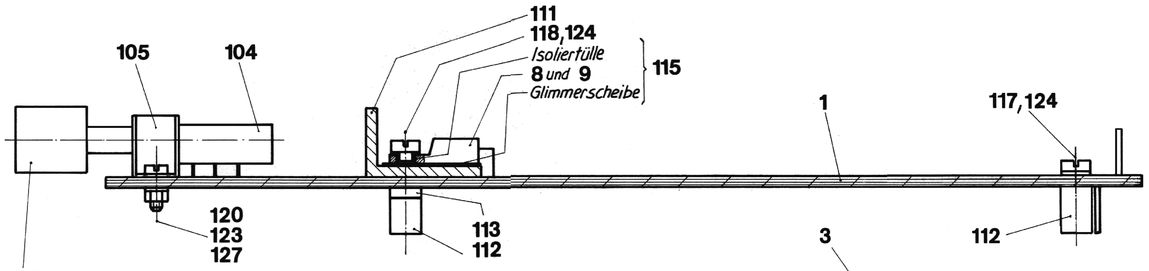
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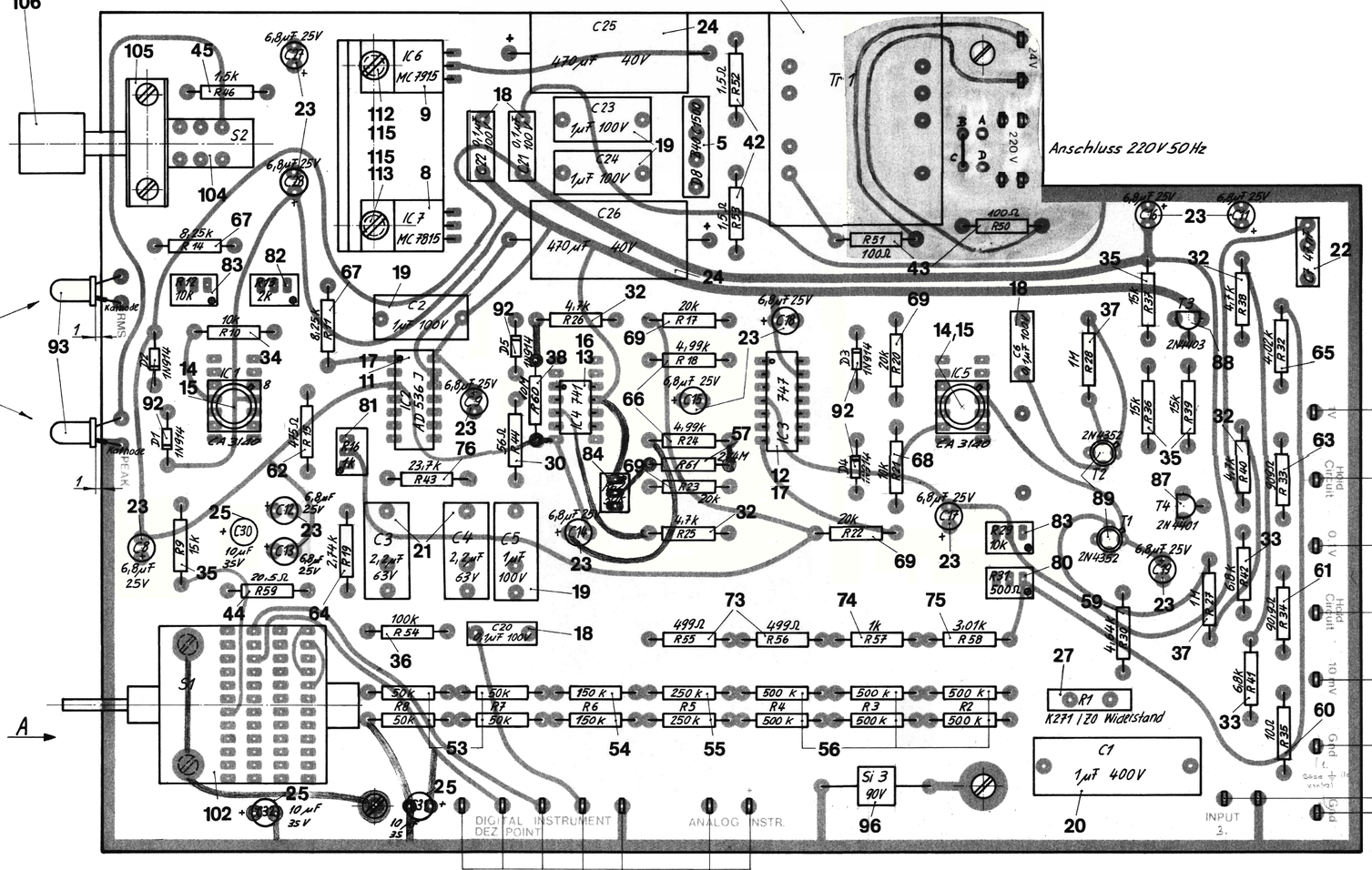
2-14257-00-A

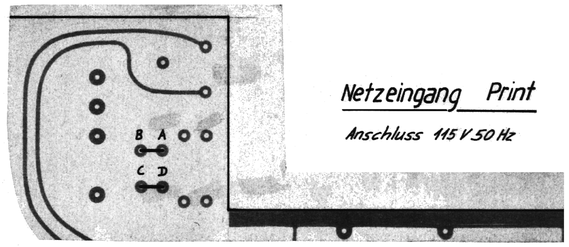
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Index	Änderungen	Feld	Datum	Visum







Netzeingang Print

Anschluss 115 V 50 Hz

Draht Cu verzinnt D 0,8mm 7-12108-00-0

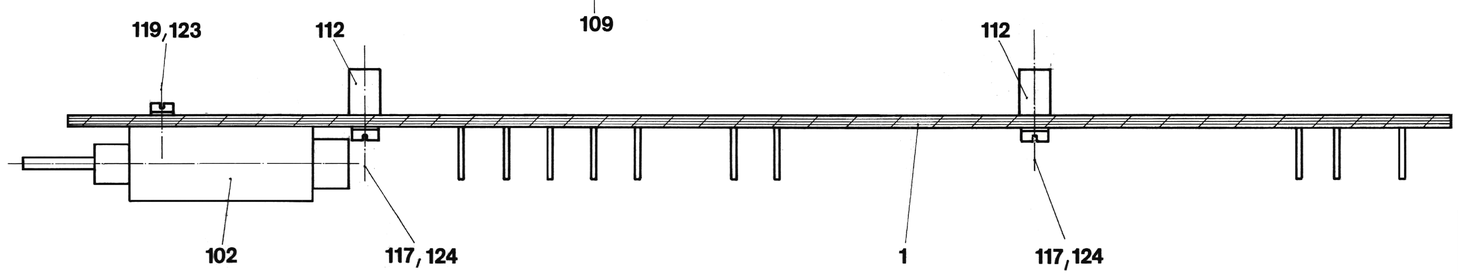
Netzanschluss 220 V 50 Hz: Drahtbrücke von B nach C.

Netzanschluss 115 V 50 Hz: Drahtbrücke von A nach B und D nach C.

Ansicht A



Schrauben in 1 und 6 einschrauben.



Stückliste : 5-14044-00-0

Schema elektr: 2-14257-00-0 Typ 5622

2-14248-00-0 Typ 5621

Stück	Gegenstand	Abmessungen	Material	Artikel-Zollnr.	Pos.	Bemerkungen
verwendet in						
5621/22		Abmessungen		Nicht tolerierte Masse	Mst. 2:1	Datum 11.12.79 Name Hä Wa
		Material				
		Oberflächenbehandlung				

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Kilovoltmeter

Print Verstärker bestückt 1-14246-00-0